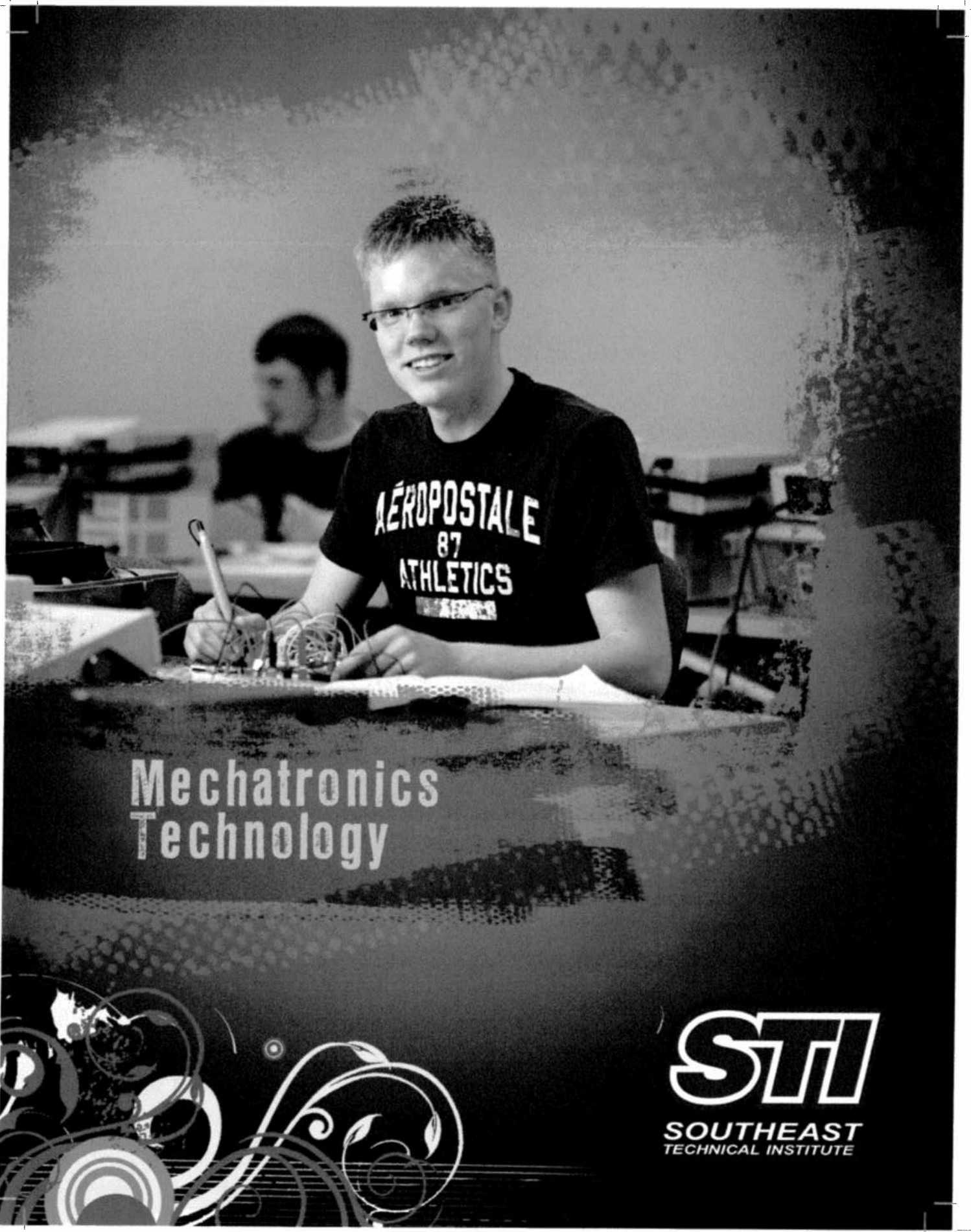

Mechatronics Technology

STI
SOUTHEAST
TECHNICAL INSTITUTE

STI SOUTHEAST TECHNICAL INSTITUTE

6/9/2009

Mark Wilson
State Director
Office of Career and Technical Education
700 Governors Drive
Pierre, SD 57501-2291

Dear Mark:

Southeast Technical Institute (STI) requests approval to reinstate a two-year associate's degree program effective school year 2009-2011. The degree to be reinstated is Electro-Mechanical Technology/Robotics Automation. The curriculum has been updated to meet the needs of today's industry requirements. We have emphasized a strong electronics background with specific training in hydraulics, pneumatics, programmable controls, and motors.

STI is also requesting a name change from Electro-Mechanical Technology/Robotics Automation to Mechatronics Technology. Mechatronics is the current name used in education for this type of degree. STI feels that this accurately portrays the relationship between mechanical and electronic systems taught in the program.

Please see the enclosed document that provides more rationale for this change. If you have any questions, please feel free to call me at 367-5462. Thank You.

Sincerely,

Craig Peters, EdD
Director of Academic Support
Southeast Technical Institute

Cc: Jeff Holcomb, Jim Jacobsen

Mechatronics Technology

Mechatronics Program Description

Mechatronics is a new and rapidly growing field that integrates mechanics, electronics, pneumatics, hydraulics and computer control systems to create new and improved automated manufacturing production systems. Mechatronic Technicians will work in almost any industry, including medical, electronics, agriculture, energy, production, and manufacturing. These technicians can have jobs in plant maintenance, equipment set-up, installation, and customer service.

Mechatronic Technicians will have one year of electronics as a core, in addition to specialty courses in essential industry disciplines. These students will have courses in Programmable Logic Controllers, Motor Controls, System Controls, Pneumatics, Hydraulics, Fluid Power, Welding, and Machining.

Rationale for Program Return

Mechatronic Technicians have always been in demand in Sioux Falls, and former graduates always had several job opportunities upon graduation. STI closed the program due to an instructor health issue, low enrollment in the Electro-Mechanical/Robotics Automation program and the high cost of offering the program. STI has hired a faculty member in our current Electronics Technology (ET) program with relevant industry experience, current students in our ET Program are indicating interest in Mechatronics, and STI is part of a grant with South Central College out of Mankato, Minnesota that will provide support to STI. STI has modified the curriculum to provide students with a common year of electronics with our ET program that will allow STI to offer students the ET or Mechatronics option efficiently.

Course Schedule

Mechatronics Technology

Course #	Course Title	Cdts
First		
SSS 100	Student Success Seminar	2
ET 116	DC/AC Electronics Lab (Coreq ET118/119)	3
ET 118	DC/AC Concepts (Coreq ET 116/119)	3
ET 119	Electronic Applications (Coreq ET116/118)	2
ENGL 101T	Composition (Preq Placement Assessment)	3
MATH 101	Intermediate Algebra (Preq Placement Assessment)	4
CIS 101	Computer Essentials	2
		19
Second		
ET 128	Technical Physics	3
ET 123	Analog Circuits (Preq ET 118/119/116)	4
ET 124	Analog Circuits Lab (Coreq ET 123)	3
ET 153	Digital Circuits I (Preq ET 118/119/116)	2
ET 154	Digital Circuits I Lab (Coreq ET 153)	2
PSYC 101T	General Psychology	3
		17
Third		
MECH 201	Fluid Power	3
MECH 202	Fluid Power Lab	3
MECH 211	Programmable Logic Controllers	3
MECH 212	Programmable Logic Controllers Lab	3
MECH 221	Motor Controls	3
MECH 222	Motor Controls Lab	2
		17
Fourth		
ENGL 201	Technical Writing (Preq ENGL 101)	3
MECH 205	Welding	2
MECH 251	Control Systems	3
MECH 252	Control Systems Lab	2
MCT 115	Machine Tool Operations	2
SOC	Social Science Elective:	3
	or SOC 150 - Social Problems,	15
	or SOC 250 - Marriage and the Family	
	TOTAL	68

Mechatronics Course Descriptions - New Courses Only

MECH 201 – Fluid Power – 3 Credits (Formerly EM 201 – Fluid Power)

This course provides the lecture section of the concepts and operation of fluid systems. All concept theories will be presented with reference to hydraulic and pneumatic principles. The inherent advantages and control applications of these systems will be the main focus.

MECH 202 – Fluid Power Lab – 3 Credits

This course provides the laboratory section of the concepts and operation of fluid systems. All concept theories will be presented with reference to hydraulic and pneumatic principles. The inherent advantages and control applications of these systems will be the main focus.

MECH 211 – Programmable Logic Controllers – 3 Credits (Formerly EM 227 – Programmable Controllers)

This course provides the lecture section of how programmable controllers are utilized. This course will provide an understanding of the PLC's role in modern day control systems. The course works with solid state sensors, various input/output modules, and different loads. Student-written ladder logic programs will be implemented into the control of the various applications.

MECH 212 – Programmable Logic Controllers Lab – 3 Credits

This course provides the laboratory section of how programmable controllers are utilized. This course will provide an understanding of the PLC's role in modern day control systems. The course works with solid state sensors, various input/output modules, and different loads. Student-written ladder logic programs will be implemented into the control of the various applications.

MECH 221 – Motor Controls – 3 Credits (Formerly EM 225 – Motor/Controls)

This course provides the lecture section of a systems approach to electric motors and their controls. Basic electricity, motor overload protection, motor controls, and the introduction of their application with programmable controllers will be presented. Students will gain hands-on experience with industrial hardware involving components of motors, motor drivers, and motor controls.

MECH 222 – Motor Controls Lab – 2 Credits

This course provides the laboratory section of a systems approach to electric motors and their controls. Basic electricity, motor overload protection, motor controls, and the introduction of their application with programmable controllers will be presented. Students will gain hands-on experience with industrial hardware involving components of motors, motor drivers, and motor controls.

MECH 205 – Welding – 2 Credits

This course provides basic welding principles utilizing various welding methods and welders. The course is designed to provide the students with an introduction to safe welding practices.

MECH 251 – Control Systems – 3 Credits

This course provides the lecture section of a course to manage the behavior of electronic devices or systems. Students will learn about logic controls, sequential controls, and feedback to build and control systems by utilizing sensors, actuators, and pneumatic or hydraulics devices.

MECH 252 – Control Systems Lab – 2 Credits

This course provides the laboratory section of a course to manage the behavior of electronic devices or systems. Students will learn about logic controls, sequential controls, and feedback to build and control systems by utilizing sensors, actuators, and pneumatic or hydraulics devices.

Labor Demand

According to the South Dakota Department of Labor High Demand/High Wage Occupations spreadsheet, Mechatronics Technicians would be eligible for many of these fields. See Table 1: SD High Demand/High Wages Occupations below:

Table 1: SD High Demand/High Wage Occupations

SOC Code	SOC Title	2008 Hourly Average Wage	2008 Annual Average Wage
49-9041	Industrial Machinery Mechanics	$18.43	$38,334.00
51-4011	Computer Controlled Machine Tool Operators, Metal and Plastic	$14.89	$30,973.00
51-4031	Cutting, Punching and Press Machine Setters, Operators and Tenders, Metal and Plastic	$13.86	$28,826.00
49-9042	Maintenance and Repair Workers, General	$13.79	$28,680.00

Methodology

STI would offer the Mechatronics Technology Program as a traditional day offering. If enrollment and demand were to increase, STI would also offer an evening offering to compliment the current Electronics Technology Evening Program

Letters of Support - Attached

June 8, 2009

Mark Wilson
Director
Office of Career & Technical Education
700 Governors Drive
Pierre SD 57501

Dear Mr. Wilson:

Subject: Mechatronics Program at Southeast Technical Institute

Craig Peters of Southeast Technical Institute (STI) informs me that they are proposing a new program called Mechatronics. This is a revision to the Electromechanical program a few years ago.

We here at John Morrell - Sioux Falls believe the Mechatronics program would be valuable to our maintenance division. Our bargaining unit agreement offers our maintenance employees a career path, with a higher pay rate, specific to a 2-year program such as this one; and we have hired several STI graduates of the previous Electro-Mechanical program. The Mechatronics program looks to be well-designed to address the electrical/electronic and mechanical skills that would benefit our company.

Our employees must be able to work with hydraulics, pneumatics, PLCs, computers, motor controls, welding, instrumentation, basic mechanical systems, troubleshooting, tools, formulas, blueprints and schematics, and to communicate, written and verbally, with co-workers and management personnel. Our equipment is more and more technical, and it is beneficial to us to have employees who can bring skills and knowledge to their work.

Sincerely,

Bev Austin
Mechanical Training Coordinator

c: Craig Peters, STI
Jerry Baker, JMC

Mark Wilson - Director

Office of Career & Technical Education

700 Governors Drive

Pierre, SD 57501

Mark:

Recently Daktronics learned of the possibility of the Mechatronics program and its review at Southeast Technical Institute. We would be very supportive of this program as we have career opportunities that align nicely with its curriculum, careers such as Maintenance Technician, Machine Programmer, and Machine Technician. On average we have sought these applicants out of state due to the educational requirement. Mechatronics addresses the training and education we desire in our workforce.

In the past year we have hired approximately 13 of these types of career paths and mostly through relocation type of recruiting. To have this program located in South Dakota, within the STI family, will be a great solution not only for Daktronics but for other manufacturing related businesses.

Please find this letter as a tool of support for this program and all of its benefits to the state, STI and its industry partners such as Daktronics.

Best regards-

Tracey Deatherage

Daktronics

Recruiting Manager